Articles of Significant Interest Selected from This Issue by the Editors

Adenovirus E1A Uses Paf1 and Bre1 To Stimulate Transcript Elongation by RNA Polymerase II

Adenovirus E1A is a potent transcriptional activator widely used to study control of transcriptional initiation. E1A functions through subversion and repurposing of cellular factors. Fonseca et al. (p. 5630–5637) describe a process by which E1A recruits the human Bre1 and Paf1 chromatin-modification complexes to viral genes to enhance transcriptional elongation by RNA polymerase II. This study reveals a new mechanism employed by E1A to stimulate viral transcription, which functions at the level of transcriptional elongation.

Coronavirus Replicase-Reporter Viruses Quantify Early Replication Events

Coronavirus replication occurs in association with virus-induced membrane structures, but the dynamics of replication complex formation are not well understood. Freeman et al. (p. 5319–5327) engineer murine hepatitis viruses to express green fluorescent protein or firefly luciferase as fusions with replicase nonstructural proteins 2 and 3, indicating that the coronavirus replicase gene can accommodate expansion and expression of reporters in viable viruses. These viruses can be used to quantify replication complex formation and virus replication in infected living cells.

A Nudivirus DNA Integrated into a Plant Sap-Sucking Insect Genome

Nudiviruses are a diverse group of double-stranded DNA viruses that preferentially infect insects and marine arthropods. Transmission usually occurs through feeding or mating. Cheng et al. (p. 5310–5318) report that a nudivirus can integrate its genome into chromosomes of the brown planthopper, a sap-sucking hemipteran insect. These results highlight an example of coevolution of an invertebrate virus and a plant sap-sucking insect and enhance an understanding of nudivirus evolution.

Assembly of an Icosahedral Virus Requires Only Weak Protein-Protein Interactions

Bacteriophage P22 serves as a model for assembly of double-stranded DNA viruses with icosahedral capsids. The P22 procapsid, an assembly intermediate, is generated when coat protein interacts with an internal scaffolding protein. A single basic amino acid in this scaffolding protein is required to direct procapsid assembly, although other residues modulate affinity. Cortines et al. (p. 5287–5297) identify the binding partners in coat protein and show that relatively weak electrostatic interactions between coat and scaffolding proteins power assembly of correctly sized and shaped procapsids. This work illustrates that simple interactions govern virus capsid assembly.

Oncolytic Parvovirus H-1PV Induces Immunogenic Cell Death

Oncolytic viruses show promise when used in combination with conventional chemotherapy. Successful lysis of cancer cells requires immunogenic cell death, commonly associated with release of ATP and high-mobility group box protein B1 (HMGB1). Angelova et al. (p. 5263–5276) demonstrate that while oncolytic parovirus H-1PV activates cell death pathways in pancreatic cancer cells, ATP is not released. Moreover, extracellular HMGB1 levels are elevated in all treated cells, whether or not the cells are dying. Treatment with gemcitabine, a chemotherapeutic agent, in combination with H-1PV infection leads to extracellular release of HMGB1. A concomitant increase in interleukin-1β secretion suggests that the consistent induction of HMGB1 serves as a danger signal and activates the inflammasome, thereby converting drug-induced apoptosis into immunogenic cell death.